Quick-n-Dirty Trebuchet

by **SFHandyman** on August 25, 2007

Intro: Quick-n-Dirty Trebuchet

No Tools, No Drilling, No Cutting, No Lumber, No Saw, No Hardware, No Need to wait for your allowance, Super Easy, Super Cheap, Fast Build.

You probably already have everything necessary to build this Trebuchet in your house right now.

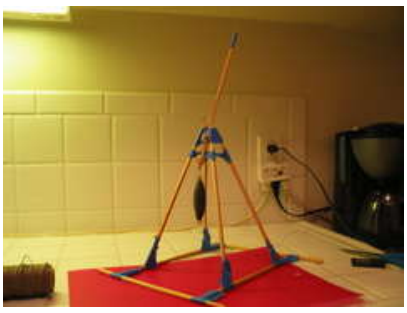
It's made out of:
9 Chopsticks*
2 Toothpicks
3/4" or larger masking tape
2 rubberbands
3 paper clips
string
Something for a weight - I used a fishing weight 5.75oz or 166g - it could handle twice that though.

The complete tool list:
Scissors

- I used the better Bamboo ones you buy - 20 for 3.50 at Amazon. I didn't buy these, I've had them for years. They also make imitations of this style in hard plastic. They would probably work great also. The ones I used are 10.25" or 26cm. They are not fancy, no artwork or lacquer. This was an ideal length. You could probably use the free ones from take away, but they are shorter and lighter. You probably wouldn't be able to do quite as much weight, or fling as far. You could probably use lacquer ones also but they are expensive and it would be harder to keep it together as the tape wouldn't stick to the lacquer as easily. They are often shorter also. You could also try it with pencils but once again, they are shorter so you wouldn't get the performance that you get out of these chopsticks.

This video shows you what the finished trebuchet looks like.

This video lets you see it fly.



step 1: Parts

These are the parts I used:

9 Bamboo chop sticks
3 paper clips
2 rubber bands
3/4" masking tape - wider is fine
2 toothpicks
some string
and a weight

The only tool I used was a pair of scissors. (you could probably use a pocket knife instead)

I don't have any plans or measurements except the chopsticks are 10.75" or 26mm. The weight I'm using in the video is 5.75 oz or 166g. It's a fishing weight. I tried a heavier weight but it goes 20' and hits the wall. My longest space in my apartment is 20', so I can't check right now how far it would go.

I also didn't try to tune it or see how much weight it could handle, so It might be capable of more.

step 2: Assembly

Everything is just taped together with masking tape. I didn't try to make pretty attachments. You could probably make them look a lot nicer and cleaner. It would probably look really nice just tied together with string, like they used to use leather on the originals.

I started with connecting the top part of the A Frame sides. I keep calling them the 'saddles' in my head. They hold the top of the A frame together and support the boom axle (paper clip). When I was finished with the whole thing, I realized those were just slightly off and it was making the boom pull down crooked, so I re-taped them.

I'm going to skip this step now and do it at the end. When I did at the end it was a lot easier to get it accurate so even though you see them in place during the other steps don't worry about it, we will do them at the end.

So you should start with the base of the A-Frames. It's two vertical chopsticks taped to 1 horizontal chopstick. The vertical chopsticks are about 1 3/4 inches from the end of the horizontal. Be aware that the tops of those vertical pieces form an A frame and eventually will almost meet, so when you tape the bottoms, make sure you install them in a way that they will easily come together at the top when we tape the top.

I had two different styles of chopsticks to work with. There were some tapered and some that were just round cylinders. They were all the same length though. I used 4 matching tapered ones for the sides of the A frame because it's important that they meet at the same point. The other ones don't really matter and can be any style, just make sure they are the same length.

When taping, get as much adhesive touching the uprights as you can - press the tape into the sides. The chopsticks will slide under the tape if you pull hard so be generous and use long pieces of tape.

I didn't measure, just eyeballed it. After you do one set, just put it next to the first and make them match.

Image Notes
1. I moved this step to the end. It's easier there.

step 3: Add base cross pieces

These add stabilization and keep the A-Frame square. Let them sit flat on the ground like the other horizontals so they can provide more stability.

Photos tell how I did it.

They extend about 1 1/2 inches from the end of the A-Frame Horizontals.

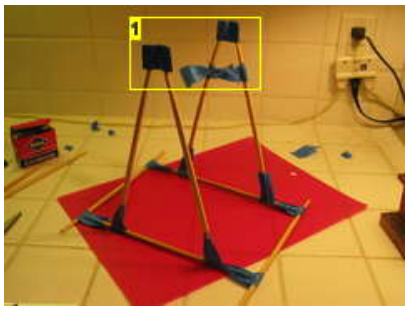


Image Notes
1. We will do this stuff at the end. It's easier there.

step 4: Boom Axle

I made the boom axle out of a normal paper clip - not a large one.

The top one was my original. The bottom one is the new one.

I realized during the rebuilding that making the bent loop in the center - longer - works better. So where I have the corners are a little too close together. Move those corners out another 1/4" on each side.

When you get it into the shape pictured, curve the bottom wire up until the side hooks lay flat, like the original one. The curve is more like the radius of a tube of lip balm not the chopstick.

(in the second photo, I want your curve to be larger, make it clear the chopstick by 1/4")

This is the boom and axle. I attach these together with a rubber band. You want the rubber band to wrap on the side without the wire - back and forth. The rubber band should pull on the sides of the vertical curve - not the sides of the hooks.

Don't make the rubber band really tight. Just snug. If it's too tight it will deform the hooks and if it's just snug, you will actually get a little assist from the rubber band, when you launch.

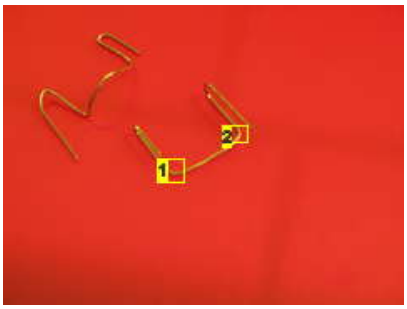


Image Notes
1. Move this out another 1/4 inch.
2. Move this out another 1/4 inch.

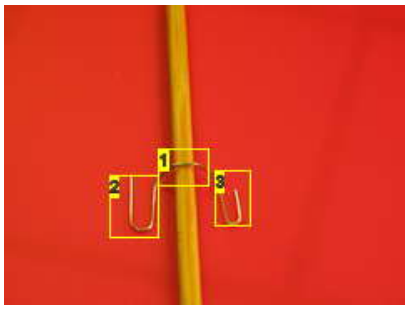


Image Notes
1. Rubber band will grab this portion of the wire - Not the sides of the hooks.
2. No Rubber band here - keep it free.
3. No Rubberband here.

step 5: Weight Hook

This is the weight hook. It's just a paper clip wrapped around the end of the boom. The side of the boom with the rubber band is up and the side with the metal is down. (the pretty wrap job went away when I increased the size of my curve - but this is what is there now and it works fine). Make the weight hook rest on the top of the boom.

To attach the weight hook to the boom use another rubber band. Just wrap it over the parts that are touching the chopstick. Make this rubber band tight.

step 6: Throwing hook

This is another paper clip. You can see how I bent it. When you are finished you may need to bend this a little tighter or looser to get the optimal release time, so give yourself room for those adjustments.

Make sure the end that is bent back won't snag your string and prevent release. You see I have mine tucked under the bottom corner of the hook and not off to the side. The string can slide freely up the hook and not get caught on the end of the wire.

You could actually bend it with the end being at the top of the hook instead of looped back over. It's a little safer with the end looped. If you accidentally release it, and this hook hits you, it won't cause any damage like a pointed hook would.

I could have bent the hook flatter. I had a little sideways bend there but I was trying to do this entirely without tools. A pair pliers, or even a tap with a hammer would straighten that out.

Once again, it's not important for function. It works fine like this.

The flat part that goes on the boom lays across the top side of the chopstick and is attached with tape (you could use a rubber band also - but tape isn't as heavy and you want the smallest weight possible on this end of the boom).

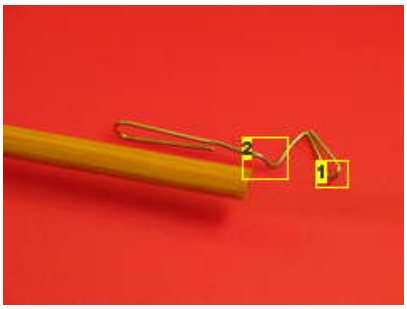


Image Notes
1. Not as dangerous as the point at the end of the wire.
2. This could really be flat. The sideways bend is just me being lazy and avoiding tools.

step 7: Taping the Saddles

This is the top of the A Frame. The chopsticks weren't meeting with the first tape job so I redid it.

The chopsticks do not touch. Allow the width of one or two chopsticks between the points of the A's. Also allow a tiny bit of the chopstick to stick out above the tape. Add a few extra layers of tape on the saddles, this is where the boom axle will rest.

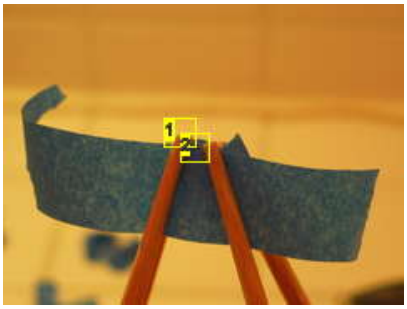


Image Notes
1. Let the chopsticks stick up above the tape a little.
2. These points do not touch. Leave about 2 chopsticks worth of distance between them.

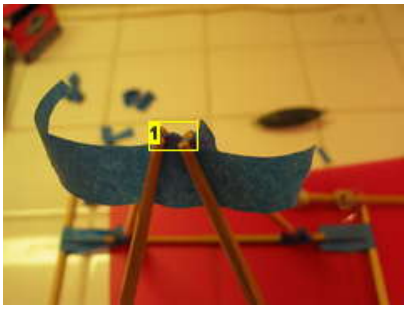
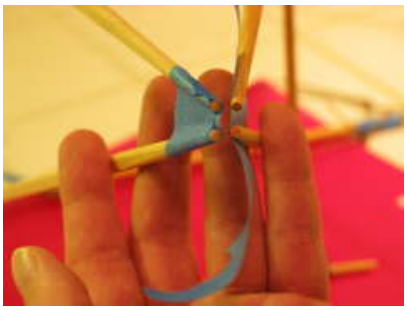


Image Notes
1. Make sure these all line up evenly.



step 8: Toothpick Brace

This X brace goes between the tops of the A's. It's kind of hard to get in. Just keep trying. The tape will slide a little bit (well this blue tape will) so you can adjust the X brace until the tops of the A's are even on both sides. The saddles at the tops of the A's should be about 3/4" apart.

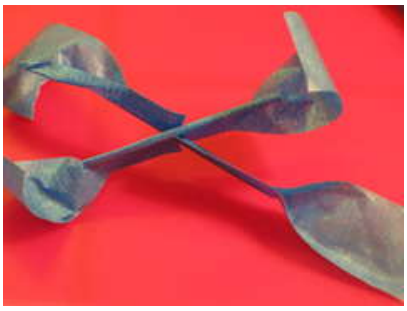
The X brace also stops the boom from swinging past vertical. If they don't stop the boom and it continues on over, the load will be thrown down to the ground right in front of the trebuchet. If you stop the boom at vertical, the load gets flung straight out.

The second image is a toothpick wrapped in tape. I've sliced the center so the two toothpicks can rest right next to each other. You don't have to do it this way. You will probably cover this whole area with lots of tape anyway. I've left the ends of the tape past the toothpick ends open as these will wrap around the sides of the A Frame.

The pictures show it sitting flat on the surface but you will be taping it with the sides already erected. This lets you position the brace in the ideal position to hold the tops of the A's and the saddle the ideal distance apart. (the tape at the top of the A's in the flat pictures was the tape that was removed and redone).

Keep adjusting the X -brace until the tops hit just right - 3/4" apart with both sides matching. When you get it spaced just right, wrap several pieces of tape around the center of the X going both directions to lock it in place.

(the saddles in these photos were all redone. They need to meet at the same place and the tip of the chopstick should stick out above the tape).



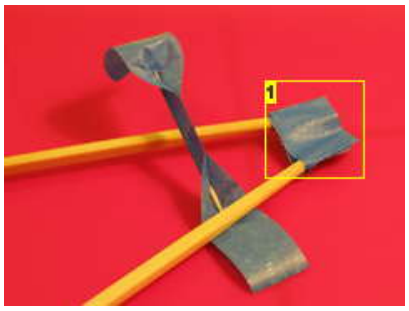


Image Notes
1. Bad job, redid this at the end.

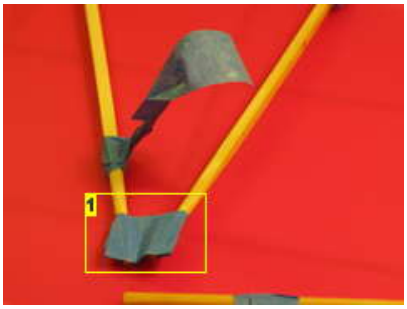


Image Notes
1. Bad taping. Chopsticks should extend a little past the saddle and be evenly spaced to match the other set.

Image Notes
1. These were redone

step 9: Fitting the boom

Here you can see that I actually pull the ends of the boom axle hooks out some, so the tops rest on the tops of the saddles. The ends also have to be pulled out. When the boom is armed, you don't want the ends of the hooks hitting the chopsticks of the A frame. You might just have to fiddle with this until you get a bend that doesn't hook the structure.

You can see how the boom is stopped by the X-Brace (Your weight hook will already be in place).

So you are done!

Fiddle with the axle bends so that the boom doesn't hit the sides of the a frame. You might have to bend the hook tops forward or backward also to get a good swing - that why I told you to keep the rubber band on the curve of the axle and not the sides of the hooks.

What you see me flinging in the videos are pen caps. I took a string and tied loops at both ends. Then hooked the pen cap over the middle of the string. Both knotted loops are put onto the boom hook.

Pull the projectile between the legs and hold it under the weight. Then release. You may need to adjust the angle of your loop hook to get the release timed just right.

That's it.

Have fun!

Image Notes
1. If your X-Brace doesn't stop the boom from going past vertical, you can push the axle up higher to add a little length to the weight end of the boom. Make sure it hits the X-Brace.